

REMARKS ON THE BAG-WORM—THYRIDOPTERYX  
EPHEMERÆFORMIS.

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(Read April 13, 1883.)

Having been asked by members of the Society quite frequently of late to explain the facts in relation to the common bag-worm, and as the facts are somewhat puzzling to the uninitiated, I have thought it of sufficient interest to state them.

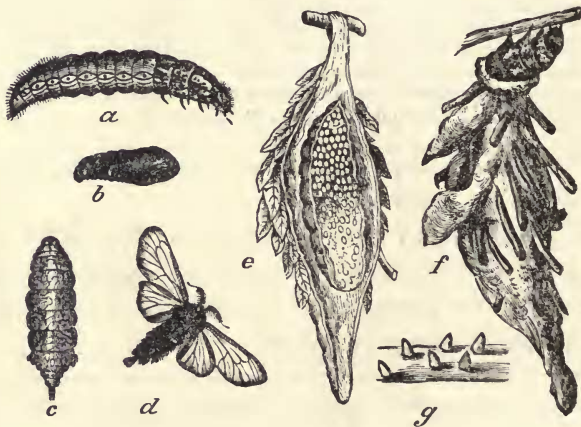


FIG. 1. THYRIDOPTERYX EPHEMERÆFORMIS: *a*, larva; *b*, male chrysalis; *c*, female moth; *d*, male moth; *e*, follicle and puparium cut open to show eggs; *f*, full grown larva with bag; *g*, young larvæ with their conical upright coverings; all natural size.

The bags, as they hang from the trees at the present time, and as illustrated by these specimens which I now exhibit, will be found to consist of very strong silk, and, while a large proportion of them contain little or nothing, many of them have within a brown shell, known as the puparium, and containing a large number of soft, yellowish eggs, interspersed with fulvous down. In a few days these eggs will hatch, the young worms from them will crawl out of the bags and disperse over the tree, covering themselves with

little conical silken coats, to the outside of which they attach bits of leaves and twigs. These bags are at first held upright (Fig. 1, *g*), but, with increase in size, they are allowed to hang (Fig. 1, *f*). In the autumn, after attaining full growth, the worms appear as in Fig. 1, *a*. They now fasten the bags to the permanent parts of the tree, and transform to the pupa state. In due time, the male pupa (Fig. 1, *b*) pushes down toward the anal orifice, and a little, black, glassy-winged moth (Fig. 1, *d*), with strongly pectinate antennæ, escapes.

The female (Fig. 1, *c*) only partly issues from her pupa shell, receives the male, and retreats into the puparium, in which she deposits her eggs.

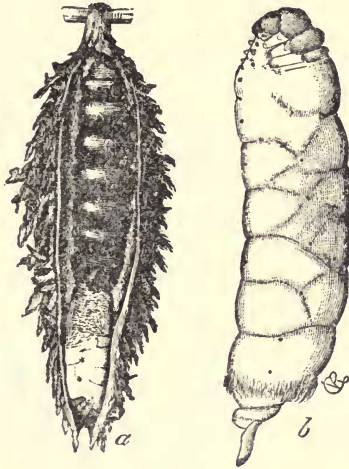


FIG. 2. THYRIDOPTERYX EPHEMERÆFORMIS: *a*, follicle cut open to show the manner in which the female works from her puparium and reaches the end of the bag, natural size; *b*, female extracted from her case, enlarged.

In reference to the act of coition, which has not been fully understood by entomologists, I quote from a former article of mine:\*

“We have seen that, by means of the partial elongation of her puparium and her partial extraction therefrom, the female is able

\* *Sci. Am.*, Suppl., April 3d, 1878.

to reach with her head to the extreme lower end of her follicle, causing, in doing so, the narrow elastic portion of the follicle to bulge, and the orifice to open more or less, as it repeatedly did while the larva was yet feeding, whenever the excrement had to be expelled. Fig. 2, *a*, shows a follicle cut open so as to exhibit the elongated puparium, and the female extended from it as she awaits the male; *b*, represents this degraded female more in detail. A cursory examination of the male shows the genital armature, which is always exposed, to consist of (1) a brown, horny, bilobed piece, broadening about the middle, narrowing to and notched at tip, concave, and furnished with a tuft of dark hairs at tip inside; (2), a rigid brown sheath, upon which play (3) the genital hooks or clasps, which are also concave inside, strongly bifid at tip, the inner finger furnished with hairs, the outer produced to an obtuse angle near tip, and generally unarmed, (Fig. 3, *e*). In repose, this

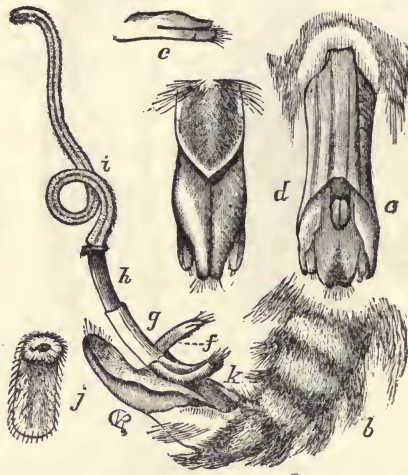


FIG. 3. THYRIDOPTERYX EPHEMERAIFORMIS: *b*, the end of male abdomen from the side, showing genitalia extended; *c*, genitalia in repose, ventral view; *d*, do., dorsal view; *e*, tip of bifid clasp; *j*, tip of penis; all enlarged.

armature appears as in Fig. 3, *c*, from beneath, and as at *d*, from above, and is well adapted to prying into the opening of the follicle. The male abdomen is telescopically extensile, while the tip easily bends or curves in any direction, but most naturally beneath, as at *b*, where it is represented enlarged about six times, and with

all the genital parts expanded; *k*, the fixed outer sheath; *f*, the clasps; *g*, a pale membranous sheath, upon which the præputium (*h*) plays, as on the finger of a glove; *i*, the fleshy elastic penis, armed with retorse hairs, and capable of extending to nearly one-fourth of an inch; *j*, showing the end still more fully enlarged. With this exposition of details, not easily observed or generally understood, the act of fecundation is no longer a mystery.

“Experiments made in 1878 led me to conclude that parthenogenesis, although not improbable, seldom occurred in this species. In some sixty instances where I excluded the males, the females either worked out of their follicles and dropped to the ground without ovipositing, or else died and dried up in the ends of the same, likewise without laying. I have found the same to hold true in those exceptional cases (four have already come under my notice) where, in a state of nature out of doors, the larva had undergone its transformations head upward. In every instance the poor female had worked out of the puparium and butted against the closed end of the follicle, perishing finally without laying, because the male could not reach her.\*

“The impregnated female that has laid her eggs always works out of her follicle when her task is completed, and drops to the ground exhausted; but she may at once be distinguished from those which perish without ovipositing by her shrunken, eggless body.

“The fawn-colored down, which the female intermingles with her eggs, is composed of the silky hair rubbed from her body. If examined while yet in the puparium, and just before she would naturally issue therefrom, each ring of the body of the female is seen to be more or less clothed with this silky material, while the eggs are perfectly free from it until they are laid. Under the microscope, this covering is seen to consist of the most delicate fibres, many times finer than ordinary silk, and it is so easily detached that most of it rubs off and remains in the puparium on the partial issuing therefrom of the female.”

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\* Since this was written more elaborate experiments have fully determined that parthenogenesis does occasionally occur in the species.